

REMARKS

Status of Claims

Claims 1-14 are currently pending and have been considered.

Claim Rejections - 35 USC § 112

Claims 1, 2, 4, 7, 8-13 and 14 are rejected under 35 U.S.C. 112, second paragraph.

In response, the claims have been carefully reviewed and amended from “European format” to “US format”.

Claim 1 recites the limitation "CSF impurities" in lines 13 and 14.

This has been corrected to “CSP impurities”.

Claim 1 cites that "the process has the form of a glass-on-glass grinding process" but it is unclear which process is being referred to.

Claim 1 has been carefully revised for clarity, and now includes a step (c) reciting “milling the glass materials against each other in a glass-on-glass grinding process to form particles”. The waste glass, having been crushed and freed from impurities, is ground by milling the glass materials against each other, then sieved, and the larger particles again milled such that even the CSP impurities can pass through the outlet orifices and not foul the spinner basket. The advantage of glass-on-glass grinding, without a dedicated grinding tool, is the avoidance of introduction of abrasives as foreign (non-glass) matter if abrasives were used in the glass grinding process (e.g., abrasive metal particles in bat mills – paragraph [0034]).

Claim 2 cites the ranges "approx. 0.3-1.5 mm" and approx. 0.6-1.1 mm". It is unclear which range the applicant is seeking.

The preferred limitations have been removed to dependent claims.

Claim 4 recites the limitation "formed particles" in line 5. There is insufficient antecedent basis for this limitation in the claim.

Claim 4 has been amended for clarity.

Claims 7, 8, 12, and 13 recite the limitation "foreign substances" in line 3 of claims 7 and 8 and line 4 of claims 12 and 13. There is insufficient antecedent basis for this limitation in the claims.

In response, the term "foreign" has been amended to "non-glass".

Claims 10 and 14 cite multiple ranges for the granulometry. It is unclear which range the applicant intends.

The preferred limitations have been removed to dependent claims.

Claim 11 cites multiple ranges for the proportion of waste glass granulate. It is unclear which range the applicant intends.

The preferred limitations have been removed to dependent claims.

Claims 1 and 9 cite the granulometry of the ground waste glass "corresponding to the diameter of the outlet orifices in the peripheral wall of the spinner is approx. 0.1-2 mm". It is unclear whether it is the granulometry or the orifice diameter that is approx. 0.1-2 mm.

The claims have been amended to define the orifice diameter as approx. 0.1-2 mm, and to define the particles as adjusted to pass through the orifices.

The claims are generally narrative and indefinite, failing to conform with current U.S. practice of providing positive active steps to define method claims. Additionally, the claims do not delineate the body of the claim with its preamble making it unclear what set of limitations sets forth the claimed method.

In response, the claims have been carefully reviewed and amended from "European format" to "US format".

Present Invention

Applicants first review the distinguishing features of the present invention.

Industrial waste glass is preferred in the manufacture of glass fibers due to high homogeneity and low impurities. However, industrial waste glass is becoming increasingly

scarce.

Standard waste glasses are available, but are frequently contaminated by secondary constituents such as, e.g., bottle caps, clay and ceramic proportions, stone proportions, porcelain proportions, labels, residual contents, metallic constituents, and many more. Ferromagnetic metallic residues may largely be removed magnetically. Paper components may burn up or may be removed by washing, but it is difficult to remove Ceramic, Stone and Porcelain (CSP) in the waste glass. For example, a single "Steinhager" liquor bottle (bottled in stone crocks) inside a community glass recycling collection container would contribute impurities in the range of several ppm's based on the total contents in the collection container.

It has been attempted to spin glass fibers from such standard waste glass containing CSP particles, but the CSP particles, which do not melt as fast as the glass particles, passing through outlet orifices in the peripheral jacket of a spinner basket will cause obstruction of orifices, and may result in a considerable disturbance of the continuous fiberization process on the production line.

Attempts to use standard (i.e., other than industrial) waste glass to make glass fibers has until now involved separating out CSP but this is highly problematic. Accordingly, it is accepted that it is presently not possible to use waste glass (other than originating from industrial wastes) in the manufacture of glass wool.

The present invention provides a different approach and solution to above problem and is characterized by "milling down everything" (of course after removal of metals and burning or washing out combustible impurities). In the present invention, even though CSP particles may only be measured in PPM in the waste glass, entire batches of CSP contaminated waste glass are ground down to such a granulometry that the grain size of the CSPs is such that they can pass through the orifices without disturbing the fiberization process at all. Thus, the present invention makes it possible to use standard waste glass free of problems in the fiber glass manufacturing process.

The present approach is contrary to conventional thinking since (a) glass is melted in the spinning process, thus feed glass particle size is irrelevant, (b) particles should not be milled too finely, as this produces glass dust which is a health concern, and (c) the larger the

particles, the easier it should be to remove CSP, thus fine milling is not obvious.

Claim Rejections - 35 USC § 103

Claims 1-7, 9, 10, and 14 are rejected under 35 u.S.C. 103 (a) as being unpatentable over Harada (US 6,446,886 B2) in view of Yang et al. (US 5,900,037).

In response, Applicants first point out that present independent claims recite inventive process steps. That is, in the prior art, no consideration had been given to controlling particle size. Since the main constituent of the waste glass was glass, and since the glass is melted completely in the glass fiber spinning process, the size of particles of glass fed into the glass spinning process was completely irrelevant. On the other hand, it was also known that CSP plug spinner orifices, but the approach to solving the problem had been to attempt to completely remove CSP.

Rather than follow conventional thinking and attempt to remove all CSP, the inventors instead took the approach to “mill down” entire batches of CSP contaminated waste glass (even though the content of CSP may only be measured in PPM) to such a granulometry that the grain size of the entire batch, including CSPs, is such that they can pass through the spinner basket orifices without disturbing the fiberization process at all. The prior art has no appreciation that the problem of use of CSP containing waste glass to make fibers can be overcome by this approach.

As set forth in *Ex parte Viscardi*, 136 USPQ 382, where the manipulative steps of applicants' group of claims do not inherently result from the disclosure of the basic reference, that reference does not render the claims obvious. In *Viscardi* the applicant discovered that addition of carbon dioxide will remove static electricity from a printing press. The Examiner rejected the application over a reference which taught addition of carbon dioxide, but for a different reason. The court held that there is merit in the contention that a reference patent does, as urged by the Examiner, inherently provide carbon dioxide which will remove static electricity. However, *in an absence of appreciation* by patentee (the reference) of the fact that carbon dioxide will remove static electricity, there is no reason why he, or one skilled in the art following his teaching, should inherently adjust the concentration of carbon dioxide for removal of complete static charge; hence, manipulative steps of applicant's claims do not

inherently result from reference's disclosure.

Here, likewise, even where the prior art may teach milling or grinding, it does not teach or suggest the present invention involving the manipulative steps of (rather than attempt to remove all CSP) adjusting particle size of waste glass including CSP so that all particles to fit through the spinner. Absent appreciation that adjusting rather than remove CSP will solve the problem in the glass fiber spinning art, the prior art does not render the present invention obvious.

Turning now to Harada, this reference does not give the faintest hint of the CSP problem, and certainly does not convey any *appreciation* of the presently claimed manipulative steps - that milling down glass containing CSP to such a granulometry that the grain size of the CSPs is such that they can pass through the spinner basket orifices will allow use of such standard waste glass in the spinning of glass fiber, without disturbing the fiberization process at all.

Harada certainly teaches that waste glass is crushed and freed from rough impurities. Harada may also disclose that the crushed waste glass is then ground further and sieved so that oversized particles are sent back for further milling.

However, the object of Harada is to convert glass articles such as glass bottles into glass sands which may be effectively used as aggregates for road pavement, colored paving materials for walkways, traffic controlling white line markers to be applied on an asphalt cross-walk, various grinding materials, matrix material for potters, construction materials such as outer walls, block materials and in other application, in substitution for natural sands.

Crushed glass is sorted by size for various applications, none of which being for spinning into glass fiber.

While Harada may include a glass-on-glass grinding process, this is for crushing the glasses into fragments smaller than those of glass articles as crushed in the primary crusher, while at the same time rubbing glass fragments against each other so as to form approximately a spherical configuration and change sharp edges of these glasses which have been crushed into smooth ones. This step of making reflective particles for use in e.g. reflective paint for roadways in no way suggests the present invention.

Finally, while Harada discloses that the glass may be ground to a specified grain-size of less than 1 mm, Applicants are not claiming a product. Applicants are claiming a process

for spinning glass fiber, involving novel process steps not disclosed in or obvious over Harada.

Turning to Yang et al, this reference teaches a method and apparatus for producing mineral wool. According to the Examiner, it would have been obvious that the ground glass obtained by Harada having particle sized which could pass through the orifices of Yang et al could be used in the process of Yang et al.

Applicants respectfully submit that the Examiner is here engaging in hindsight reconstruction. The present invention would not be obvious to those working in the art absent the present disclosure.

In Yang et al no consideration is given to controlling particle size. Since glass is melted completely in the glass fiber spinning process, the size of particles of glass fed into the glass spinning process was completely irrelevant. Thus, there would be no reason to select glass with particle sizes of Harada as the material for Yang et al. In fact, it would be contrary to conventional wisdom to grind glass more than necessary, in view of industrial pollution and health concerns from very fine glass dust in the air. Yang et al, by being silent on particle size, in fact confirms that glass particle size is not relevant.

Thus, the position of the Examiner that it would be obvious to use glass with particle sizes of Harada in Yang et al is flawed.

Further, the absence of CSP in Harada shows that the Examiner is attempting "hindsight reconstruction" of the present invention from two references which fairly read provide no suggestion for the present invention in which entire waste glass batches are milled down to a size able to pass through a spinner orifice.

Were one to use the glass of Harada in the process of Yang et al, one would either (a) use waste glass free of CSP (Harada do not mention CSP), which would be completely melted in the melt step, and thus there would be no reason to pay attention to particle size, or (b) one would indiscriminantly use the particles with CSP (if CSP were present) and suffer problems of clogging.

These references alone or in combination do not teach the problem of CSP contaminated waste glass, or solving the problem by milling the entire batch of waste glass including the CSP particles to such a fine diameter that they do not clog the spinner orifices.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harada in view of Yang et al as applied to claims 1-7, 9, 10, and 14 above, and further in view of Grainger (US 5,758,832).

Applicants respectfully submit that this dependent claim is patentable by virtue of it's dependency from allowable main claims.

Claims 8, 12, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harada in view of Yang et al.as applied to claims 1-7, 9, 10, and 14 above, and further in view of Miyoshi et al. (US 2006/0065017 A1).

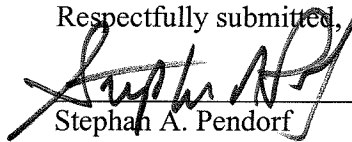
Applicants respectfully submit that these dependent claims are patentable by virtue of dependency from allowable main claims.

The Commissioner is hereby authorized to charge any fees which may be required at any time during the prosecution of this application without specific authorization, or credit any overpayment, to Deposit Account Number 16-0877.

Should further issues remain prior to allowance, the Examiner is respectfully requested to contact the undersigned at the indicated telephone number.

Patent Central LLC
1401 Hollywood Blvd.
Hollywood, FL 33020-5237
(954) 922-7315

Respectfully submitted,


Stephan A. Pendorf
Registration No. 32,665

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